

Patent claims

1. Connection element for the attachment of removable tooth dentures at crowns of teeth or tooth implants with a locking bar (R) supported slidable perpendicular to the pullout direction of the denture, wherein the locking bar is guidable by the force of one or several springs (F) as seen from the pullout direction of the denture under regions of a fixedly seated element (S) formed at one or several tooth crowns or, respectively, one or several tooth implants and wherein the locking bar with its parts effective for the locking is removable again out of these regions against this spring force by actuation of a pushbutton (D) acting upon the locking bar (R), characterized in that a locking device (A) is provided for the locking bar (R), wherein the locking device (A) is movable upon actuation of the pushbutton (D) by a spring force acting in the direction of the shift motion of the locking bar (R) or by the motion of the locking bar (R) itself or by both effects together such that the locking device effects slight lifting of the connection element in pullout direction of the denture through limit stop faces.

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2. Connection element according to claim one, characterized in that after the actuation of the pushbutton (D), a spring force acting in the direction of the shift motion of the locking bar (R) maintains the connection element in a slightly lifted position in the pullout section of the denture by the cooperation of limit stop faces and guide faces.

3. Connection element according to claim 1 ~~or 2~~, characterized in that the locking bar (R) and the locking device (A) are guided in a casing (G, G1/G2), wherein the casing is for example formed box shaped or sleeve shaped and which is ~~attachable~~ by soldering, welding or gluing at the denture frame, wherein the recess in the denture frame is pre-formable with auxiliary parts out of plastic, metal or ceramic for receiving the casing and wherein the connection to the denture frame is produceable by a dovetail shaped extension (20).

4. Connection element according to claim 1 ~~or 2~~, characterized in that the locking bar (R) and the locking device (A) are guided in corresponding recesses directly in the denture frame, which recesses are produceable for

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example by drilling, by spark erosion and/or by employing of auxiliary parts made of ceramics or out of a high melting metal.

5. Connection element according to ^{claim} ~~one of the claims 1 through 4~~, characterized in that the locking device (A) forms a self-contained, movably supported part which is placeable into motion upon actuation of the pushbutton (D) by the force of at least one spring (F) and/or the co-action of limit stop faces and guide faces and which effects slight lifting of the connection element in pullout direction by pushing of a limit stop face (11,24,32,36) at the fixedly seated element (S).

6. Connection element according to claim 5, characterized in that the locking device (A) in the casing (G), in the denture body or in the locking bar (R) is supported slidable at least along a closing-basal direction and/or supported rotatable around an axis disposed perpendicular to the direction of motion of the locking bar (R), wherein a falling out in a basal direction is prevented by limit stops for example at the casing (G) or at the bolt (B).

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7. Connection element according to ^{claim 1}~~one of the claims 1 through 6~~, characterized in that the force of the at least one spring (F) is directly transferable, wherein the spring (F) also can be attached at the locking device (A) or indirectly transferable onto the locking device (A) upon actuation of the pushbutton (D) and after releasing the pushbutton (D).

8. Connection element according to ~~one of the claims 1 through 7~~, characterized in that the motion of the locking bar (R) is directly transferable or is indirectly transferable through a bolt (B) onto the locking device (A) upon actuation of the pushbutton (D).

9. Connection element according to ^{claim 1}~~one of the claims 1 through 8~~, characterized in that upon actuation of the pushbutton (D), both the force of the at least one spring (f) as well as by way of limit stop faces (12, 13, 37, 38) the motion of the locking bar (R) are transferable onto the same bolt (B) and through further limit stop faces (10, 35) onto the locking device (A).

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claim 1

10. Connection element according to ~~one of the claims 1 through 4~~, characterized in that the locking device (A) together with the locking bar (R) forms a common part, wherein the common part is supported limited rotatable around an axis disposed in the direction of the shifting motion in addition to a shiftable support and wherein upon actuation of the pushbutton D the common part is placed into rotation by the co-action of the limit stop faces and guide faces and wherein a slight lifting of the connection element in pullout direction is effected by pushing of one limit stop face (45) at the fixedly seated element (S).

claim 1

11. Connection element according to ~~one of claims 1 through 10~~, characterized in that the locking device (A) holds the locking bar (R), after the locking bar has been moved upon actuation of the pushbutton (D) against the force of at least one spring (F), in this position upon removal of the denture by the co-action of limit stop faces (6,14,25,26,29,33,39,40,46,47) and releases upon insertion of the denture based on the pushing of limit stop faces (11,24,32,36) of the locking device (A) again at the fixedly seated element (S), such that the locking bar (R) can be led back again by the spring force.

claim 1

12. Connection element according to ~~one of the claims 1 through 10~~, characterized in that the locking bar (R) is led back again by the spring force upon removal of the denture after moving the locking bar (R) upon actuation of the pushbutton (D) against the force of at least one spring (F), and wherein the locking bar (R) is moved again against the force of the at least one spring (F) during insertion of the denture by the action of inclined guide faces, wherein the locking bar (R) is then again led back by the spring force in case the denture is fully inserted.

claim 1

13. Connection element according to ~~one of the claims 1 through 12~~, characterized in that the movable parts are secured against falling out in the direction of the spring (F) by the locking device (A) itself, by a sleeve shaped screw (Sch1) inserted in the direction of the shifting motion of the locking bar (R) or by screw (Sch2, Sch3) inserted from the basal direction and wherein the disassembly is performed by pressing in of the locking device (A) against the spring force acting onto the locking device (A) through limit stop faces or by removing of the screw (Sch1, Sch2, Sch3).

claim 1

14. Connection element according to ~~one of the claims 1 through 13~~, characterized in that the fixedly seated element is formed by a web extension or by a web (S), wherein parts of the denture framed or of the casing (G) can engage in guide grooves and wherein the locking bolt engagement can be performed one-sided or two sided.

claim 1

15. Connection element according to ~~one of the claims 1 through 14~~, characterized in that a sleeve (H) is provided for better guiding of the locking bar (R) through the prosthetic body.

claim 1

16. Connection element according to ~~one of the claims 1 through 15~~, characterized in that the diameter of the pushbutton (D) is of the same size or larger as the diameter of the locking bar (R), wherein the pushbutton (D) and the locking bar (R) form a common part or are connected to each other by press fitting, bolting or screwing together.

claim 1

17. Connection element according to ~~one of the claims 1 through 16~~, characterized in that the spring (F) is disposed within the locking bar (R) or outside of the locking bar (R)

between the locking bar (R) and the casing (G), of an outside disposed sleeve (H) or of a sleeve shaped screw (Sch1).

18. Connection element according to ^{claim 1}~~one of the claims 1 through 17~~, characterized in that the individual construction parts are formed as confection parts out of a dental alloy, out of titanium, out of a spring material or out of plastic.

Add B²

Add C¹

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